CLAIMS

and

 A method of manufacturing a composite material comprising: forming a mixture comprising a plurality of fibers and a borazine oligomer;

subjecting the mixture to a first heating, for 12 hours to 56 hours;

subjecting the mixture to a second heating;

wherein the temperature of the first heating is 60 °C to 80 °C, and the pressure during the first heating is at least 0.5 MPa,

the temperature of the second heating is at most 400 °C, and the greatest pressure of the second heating is at least 15 MPa.

- 2. The method of claim 1, further comprising subjecting the mixture to a third heating, wherein the temperature of the third heating is at least 1200 °C.
- 3. The method of claim 1, wherein the borazine oligomer is obtained by heating borazine for 24 to 48 hours, at a temperature of 60 °C to 80 °C.
 - 4. The method of claim 1, wherein the fibers are carbon fibers.
- 5. The method of claim 1, wherein the pressure during the first heating is 1 MPa to 6 MPa.
- 6. The method of claim 1, wherein the temperature of the first heating is 65 °C to 75 °C, and the pressure during the first heating is 1.5 MPa to 5 MPa.
- 7. The method of claim 1, wherein the temperature of the first heating is 68 °C to 72 °C, and the pressure during the first heating is 2.0 MPa to 4.6 MPa.
- 8. The method of claim 1, wherein the temperature of the second heating is increased at a rate of 0.25 °C/min to 3 °C/min.

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- 9. The method of claim 1, wherein the temperature of the second heating is increased at a rate of 0.75 °C/min to 1.25 °C/min.
- 10. The method of claim 1, wherein the temperature of the second heating is increased at a rate of 0.9 °C/min to 1.1 °C/min.

5 11. The method of claim 1, wherein the greatest temperature reached during the second heating is 130 °C to 170 °C, and the greatest pressure is 12 MPa to 32 MPa.

- 12. The method of claim 1, wherein the greatest temperature reached during the second heating is 140 °C to 160 °C, and the greatest pressure is 16 MPa to 26 MPa.
- 13. The method of claim 1, wherein the greatest temperature reached during the second heating is 148 °C to 152 °C, and the greatest pressure is 21 MPa to 23 MPa.
 - The composite material made according to the method of claim 1. 14.
 - 15. The composite material made according to the method of claim 2.
 - 16. The composite material made according to the method of claim 3.
- 17. A composite material comprising carbon fibers in a boron nitride matrix, wherein the composite material has a density of at least 1.62 g/cc.
- 18. The composite material of claim 17, wherein the composite material has a density of 1.62 to 1.75 g/cc.
- 19. A composite material comprising carbon fibers in a boron nitride matrix, wherein the composite material has a wear rate of at most 0.4 mg/m at an energy level of 100 kJ/kg to 1100 kJ/kg, and a coefficient of friction of at least 0.22 at an energy level of 100 kJ/kg to 1200 kJ/kg.

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20. A method of manufacturing a composite material comprising boron nitride, comprising:

forming a mixture comprising a preform and a borazine oligomer; subjecting the mixture to a first heating, for 12 hours to 56 hours;

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subjecting the mixture to a second heating;

wherein the temperature of the first heating is 60 °C to 80 °C, and the pressure of the first heating is at least 0.5 MPa, and

the temperature of the second heating is at most 400 °C, and the greatest pressure of the second heating is at least 15 MPa.

- 21. The method of claim 20, further comprising subjecting the mixture to a third heating, wherein the temperature of the third heating is at least 1200 °C.
- 22. The method of claim 20, wherein the borazine oligomer is obtained by heating borazine for 24 to 48 hours, at a temperature of 60 °C to 80 °C.
- 23. The method of claim 20, wherein the preform is a 3D needled carbon fiber preform.
- 24. The method of claim 20, wherein the preform is a CVI-infiltrated 3D needled carbon fiber preform.
 - 25. The composite material made according to the method of claim 20.
 - 26. The composite material made according to the method of claim 21.
- 27. A composite material comprising a 3D needled carbon fiber preform impregnated with boron nitride having a density of at least 1.63 g/cc.
- 28. The composite material of claim 27, having a density of 1.63 g/cc to 1.72 g/cc.

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- 29. A composite material, comprising CVI-infiltrated carbon fiber preform impregnated with boron nitride having a density of at least 1.62 g/cc.
- 30. The composite material of claim 29, having a density of 1.62 to 1.80 g/cc.

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- 31. A composite material comprising a 3D needled carbon fiber preform impregnated with boron nitride having a wear rate of at most 0.05 mg/m at an energy level of 100 kJ/kg to 1000 kJ/kg, and a coefficient of friction of at least 0.12 at an energy level of 100 kJ/kg to 900 kJ/kg.
 - 32. A brake for aircraft comprising the composite material of claim 17.

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- 33. A brake for aircraft comprising the composite material of claim 27.
- 34. An aircraft comprising the brake of claim 32.
- 35. An aircraft comprising the brake of claim 33.
- 36. A method for decelerating an aircraft comprising braking the aircraft with the brake of claim 32.

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37. A method for decelerating an aircraft comprising braking the aircraft with the brake of claim 33.